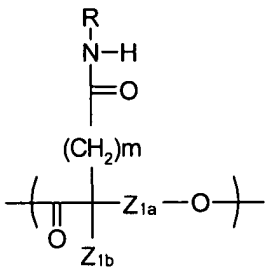
B. Claims

The following is a complete listing of the claims, and replaces all earlier versions and listings.

1. (Currently Amended) A polyhydroxyalkanoate comprising one or more units represented by ~~the~~ chemical formula (1) in a molecule~~;~~:

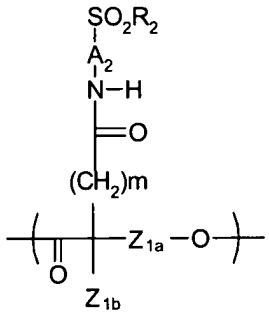


(1),

wherein R represents $-A_1-SO_2R_1$, R_1 represents OH, a halogen atom, ONa, OK, or OR_{1a}, R_{1a} and A_1 each independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, Z_{1a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal ~~thereof.~~thereof, Z_{1b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group, which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and if more than one unit of the chemical formula (1) is present, each of ~~when multiple units exist,~~ R, R_1, R_{1a}, A_1,

Z_{1a}, Z_{1b}, and m ~~each~~ is independently ~~have the above meaning~~selected for each unit.

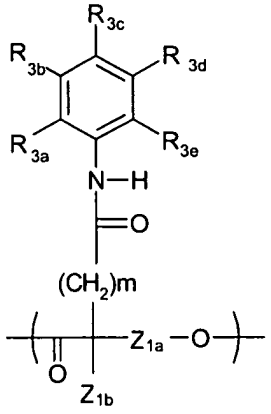
2. (Withdrawn-Currently Amended) ~~A~~ The polyhydroxyalkanoate according to claim 1, comprising one or more units each represented by ~~the~~ chemical formula (2), (3), (4A), or (4B) in a molecule as the one or more units each represented by the chemical formula (1):



(2),

wherein R_2 represents OH, a halogen atom, ONa, OK, or OR_{2a}, R_{2a} represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group, A_2 represents a linear or branched alkylene group having 1 to 8 carbon atoms, Z_{1a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{1b} represents a hydrogen ~~atom,~~atom or a linear or branched alkyl group, aryl group, or aralkyl group, which may be substituted by an aryl group, m represents an integer selected from 0 to 8,

and if more than one unit of the chemical formula (2) is present, each of ~~when multiple units exist,~~ A_2, R_2, R_{2a}, Z_{1a}, Z_{1b}, and m ~~each~~ is independently ~~have the above meaning~~selected for each unit~~;~~,



(3),

wherein R_{3a}, R_{3b}, R_{3c}, R_{3d}, and R_{3e} each independently represent SO_2R_{3f} ~~(R_{3f} represents OH, a halogen atom, ONa, OK, or OR_{3fl} (R_{3fl} represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group))~~, a hydrogen atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an OH group, an NH_2 group, an NO_2 group, $COOR_{3g}$ ~~(R_{3g} represents an H atom, an Na atom, or a K atom)~~, an acetamide group, an OPh group, an NHPh group, a CF_3 group, a C_2F_5 group, or a C_3F_7 group ~~(Ph represents a phenyl group)~~, and at least one of these groups represents SO_2R_{3f}, Z_{3a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and

a cyclohexyl structure at a terminal thereof, Z_{3b} represents a hydrogen ~~atom,~~atom or a linear or branched alkyl group, aryl group, or aralkyl group, which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and if more than one unit of the chemical formula (3) is present, each of ~~when multiple units exist,~~ R_{3a}, R_{3b}, R_{3c}, R_{3d}, R_{3e}, R_{3f}, R_{3f1}, R_{3g}, Z_{1a}, Z_{1b}, and m ~~each~~ is independently ~~have the above meaning~~selected for each unit,

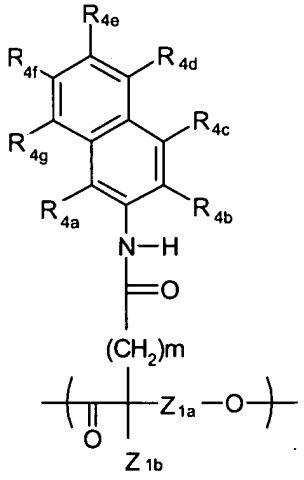
where:

R_{3f} is OH, a halogen atom, ONa, OK, or OR_{3f1};

R_{3f1} is a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group;

R_{3g} is H, Na, or K; and

Ph is a phenyl group;



(4A),

wherein R_{4a}, R_{4b}, R_{4c}, R_{4d}, R_{4e}, R_{4f}, and R_{4g} each independently represent

SO_2R_{4o} ~~(R_{4o} represents OH, a halogen atom, ONa, OK, or OR_{4o1} (R_{4o1} represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group))~~, a hydrogen atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an OH group, an NH_2 group, an NO_2 group, $COOR_{4p}$ ~~(R_{4p} represents an H atom, an Na atom, or a K atom)~~, an acetamide group, an OPh group, an NHPh group, a CF_3 group, a C_2F_5 group, or a C_3F_7 group ~~(Ph represents a phenyl group)~~, and at least one of these groups represents SO_2R_{4o}, Z_{1a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{1b} represents a hydrogen ~~atom,~~atom or a linear or branched alkyl group, aryl group, or aralkyl group, which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and if more than one unit of the chemical formula (4A) is present, each of ~~when multiple units exist,~~ R_{4a}, R_{4b}, R_{4c}, R_{4d}, R_{4e}, R_{4f}, R_{4g}, R_{4o}, R_{4o1}, R_{4p}, Z_{1a}, and Z_{1b}, and m ~~each~~ is independently ~~have the above meaning~~selected for each unit,

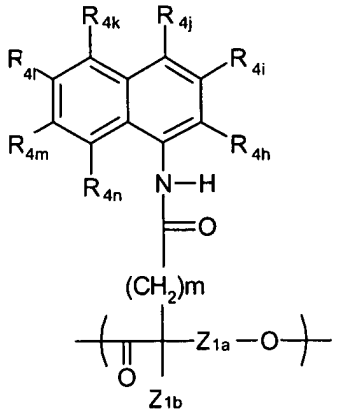
where:

R_{4o} is OH, a halogen atom, ONa, OK, or OR_{4o1};

R_{4o1} is a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group;

R_{4p} is H, Na, or K; and

Ph is a phenyl group; and



(4B)$_a$

wherein R_{4h}, R_{4i}, R_{4j}, R_{4k}, R_{4l}, R_{4m}, and R_{4n} each independently represent SO_2R_{4o} ~~(R_{4o} represents OH, a halogen atom, ONa, OK, or OR_{4ol} (R_{4ol} represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group))~~, a hydrogen atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an OH group, an NH_2 group, an NO_2 group, $COOR_{4p}$ ~~(R_{4p} represents an H atom, an Na atom, or a K atom)~~, an acetamide group, an OPh group, an NHPh group, a CF_3 group, a C_2F_5 group, or a C_3F_7 group ~~(Ph represents a phenyl group)~~, and at least one of these groups represents SO_2R_{4o}, m represents an integer selected from 0 to 8, Z_{1a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a

terminal thereof, Z_{1b} represents a hydrogen ~~atom,~~atom or a linear or branched alkyl group, aryl group, or aralkyl group, which may be substituted by an aryl group, and if more than one unit of the chemical formula (4B) is present, each of~~when multiple units exist,~~ R_{4h}, R_{4i}, R_{4j}, R_{4k}, R_{4l}, R_{4m}, R_{4n}, R_{4o}, R_{4ol}, R_{4p}, Z_{1a}, Z_{1b}, and m ~~each~~ is independently ~~have the above meaning~~selected for each unit,

where:

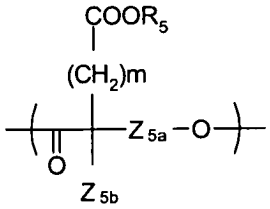
R_{4o} is OH, a halogen atom, ONa, OK, or OR_{4ol};

R_{4ol} is a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group;

R_{4p} is H, Na, or K; and

Ph is a phenyl group.

3. (Withdrawn) A polyhydroxyalkanoate comprising one or more units represented by the chemical formula (5):



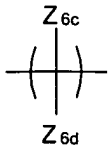
(5)

wherein R_5 represents hydrogen, a group for forming a salt, or R_{5a}, R_{5a} represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, or a group having a saccharide, m represents an integer selected from 0 to 8, Z_{5a} represents a

linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{5b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, and when multiple units exist, R_5, R_{5a}, Z_{5a}, Z_{5b}, and m each independently have the above meaning for each unit.

4. (Currently Amended) ~~A~~ The polyhydroxyalkanoate according to claim 1, wherein the linear alkylene chain structure represented by Z_{1a} in the chemical formula (1) is selected from the ~~following~~ group consisting of (A) to (D):

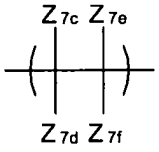
(A) when the linear alkylene chain has 1 carbon atom, in the linear alkylene chain structure represented by the chemical formula (6), one of Z_{6c} and Z_{6d} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal ~~thereof,~~thereof:



(6);

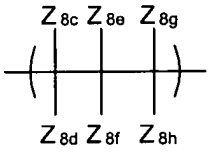
(B) when the linear alkylene chain has 2 carbon atoms, in the linear

alkylene chain structure represented by the chemical formula (7), one of Z_{7c}, Z_{7d}, Z_{7e}, and R_{7f} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal ~~thereof,~~thereof:



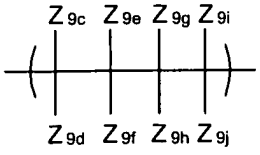
(7);

(C) when the linear alkylene chain has 3 carbon atoms, in the linear alkylene chain structure represented by the chemical formula (8), one of Z_{8c}, Z_{8d}, Z_{8e}, Z_{8f}, Z_{8g}, and Z_{8h} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal ~~thereof,~~thereof:



(8); and

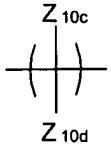
(D) when the linear alkylene chain has 4 carbon atoms, in the linear alkylene chain structure represented by the chemical formula (9), one of Z_{9c}, Z_{9d}, Z_{9e}, Z_{9f}, Z_{9g}, Z_{9h}, Z_{9i}, and Z_{9j} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal ~~thereof.~~thereof:



(9).

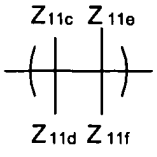
5. (Withdrawn) A polyhydroxyalkanoate according to claim 3, wherein the linear alkylene chain structure represented by Z_{5a} in the chemical formula (5) is selected from the following (A) to (D):

(A) when the linear alkylene chain has 1 carbon atom, in the linear alkylene chain structure represented by the chemical formula (10), one of Z_{10c} and Z_{10d} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof,



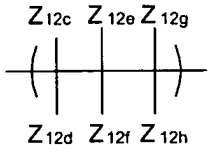
(10)

(B) when the linear alkylene chain has 2 carbon atoms, in the linear alkylene chain structure represented by the chemical formula (11), one of Z_{11c}, Z_{11d}, Z_{11e}, and Z_{11f} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof,



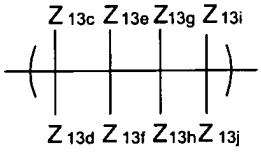
(11)

(C) when the linear alkylene chain has 3 carbon atoms, in the linear alkylene chain structure represented by the chemical formula (12), one of Z_{12c}, Z_{12d}, Z_{12e}, Z_{12f}, Z_{12g}, and Z_{12h} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof,



(12)

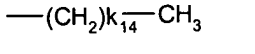
(D) when the linear alkylene chain has 4 carbon atoms, in the linear alkylene chain structure represented by the chemical formula (13), one of Z_{13c}, Z_{13d}, Z_{13e}, Z_{13f}, Z_{13g}, Z_{13h}, Z_{13i}, and Z_{13j} represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof.



(13)

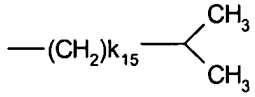
6. (Currently Amended) ~~A~~ The polyhydroxyalkanoate according to

claim 4 or 5, wherein when a substituent selected from Z_{6c}, Z_{6d}, Z_{7c}, Z_{7d}, Z_{7e}, Z_{7f}, Z_{8c}, Z_{8d}, Z_{8e}, Z_{8f}, Z_{8g}, Z_{8h}, Z_{9c}, Z_{9d}, Z_{9e}, Z_{9f}, Z_{9g}, Z_{9h}, Z_{9i}, Z_{9j}, Z_{10c}, Z_{10d}, Z_{11e}, Z_{11d}, Z_{11e}, Z_{11f}, Z_{12c}, Z_{12d}, Z_{12e}, Z_{12f}, Z_{12g}, Z_{12h}, Z_{13c}, Z_{13d}, Z_{13e}, Z_{13f}, Z_{13g}, Z_{13h}, Z_{13i}, and Z_{13j} ~~described~~ in the chemical formulae (6), (7), (8), (9), (10), (11), (12), and (13) represents a linear or branched alkyl group, or an alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, the substituent is selected from ~~substituents represented by~~ the group consisting of chemical formulae (14), (15), (16), and (17):



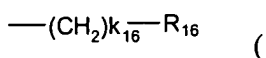
(14),

wherein k_{14} represents an integer selected from 0 to 8, and ~~when multiple units exist~~if more than one unit of the chemical formula (14) is present, k_{14} is~~, k_{14}'s each~~ independently ~~have the above meaning~~selected for each ~~unit,~~unit;



(15),

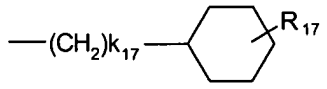
wherein k_{15} represents an integer selected from 0 to 7, and if more than one unit of the chemical formula (15) is present, k_{15} is ~~when multiple units exist, k_{15}'s each~~ independently ~~have the above meaning~~selected for each ~~unit,~~unit;



(16),

wherein k_{16} represents an integer selected from 1 to 8, R_{16} represents a substituent containing a residue having any one of a phenyl structure and a thienyl

structure, and if more than one unit of the chemical formula (16) is present, k_{16} is ~~when multiple units exist, k_{16} and R_{16} each~~ independently ~~have the above meaning~~selected for each ~~unit,~~unit; and

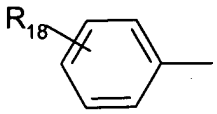


(17),

wherein R_{17} represents a substituent to a cyclohexyl group selected from an H atom, a CN group, an NO_2 group, a halogen atom, a CH_3 group, a C_2H_5 group, a C_3H_7 group, a CF_3 group, a C_2F_5 group, and a C_3F_7 group, k_{17} represents an integer selected from 0 to 8, and if more than one unit of the chemical formula (17) is present, each of k_{17} and R_{17} is ~~when multiple units exist, k_{17} and R_{17} each~~ independently ~~have the above meaning~~selected for each unit.

7. (Currently Amended) ~~A~~ The polyhydroxyalkanoate according to claim 6, wherein R_{16} in the chemical formula (16), which is a residue having any one of a phenyl structure and a thienyl structure, is selected from the group consisting of residues represented by ~~the~~ chemical formulae (18), (19), (20), (21), (22), (23), (24), (25), (26), (27), and ~~(28),~~(28):

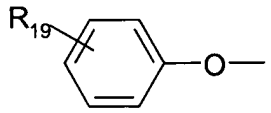
the chemical formula (18) ~~below~~ representing ~~a group of~~ an unsubstituted or substituted phenyl ~~groups,~~group:



(18),

wherein R_{18} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, a CH_3 group, a C_2H_5 group, a C_3H_7 group, a $CH=CH_2$ group, a CF_3 group, a C_2F_5 group, a C_3F_7 group, and $COOR_{18a}$ where R_{18a} is H, Na, or K~~(R_{18a} represents an H atom, an Na atom, or a K atom), a CF_3 group, a C_2F_5 group, and a C_3F_7 group~~, and ~~when multiple units exist~~if more than one unit of the chemical formula (18) is present, R_{18} ~~, R_{18}'s may be different~~ is independently selected for each ~~unit,~~unit;

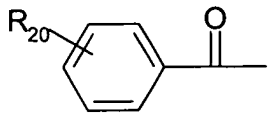
the chemical formula (19) ~~below~~ representing ~~a group of~~ an unsubstituted or substituted phenoxy ~~groups,~~group:



(19),

wherein R_{19} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, a CH_3 group, a C_2H_5 group, a C_3H_7 group, a SCH_3 group, a CF_3 group, a C_2F_5 group, and a C_3F_7 group, and if more than one unit of the chemical formula (19) is present, R_{19} is independently selected ~~when multiple units exist, R_{19}'s may be different~~ for each ~~unit,~~unit;

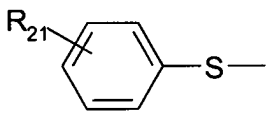
the chemical formula (20) ~~below~~ representing ~~a group of~~ an unsubstituted or substituted benzoyl ~~groups,~~group:



(20)

wherein R_{20} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, a CH_3 group, a C_2H_5 group, a C_3H_7 group, a SCH_3 group, a CF_3 group, a C_2F_5 group, and a C_3F_7 group, and if more than one unit of the chemical formula (20) is present, R_{20} is independently selected ~~when multiple units exist, R_{20}'s may be different~~ for each ~~unit,~~unit;

the chemical formula (21) ~~below~~ representing ~~a group of~~an unsubstituted or substituted phenylsulfanyl ~~groups,~~group:

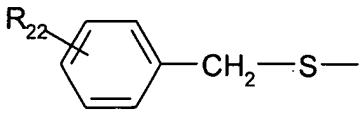


(21)

wherein R_{21} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, ~~$COOR_{21a}$, SO_2R_{21b} (R_{21a} represents H, Na, K, CH_3, or C_2H_5, and R_{21b} represents OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5),~~ a CH_3 group, a C_2H_5 group, a C_3H_7 group, a $(CH_3)_2$-CH group, ~~and~~ a $(CH_3)_3$-C group, $COOR_{21a}$, and SO_2R_{21b}, where R_{21a} is H, Na, K, CH_3, or C_2H_5, and R_{21b} is OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5, and if more than one unit of the chemical formula (21) is present, R_{21} is independently selected ~~when multiple units exist, R_{21}'s may be different~~ for each ~~unit,~~unit;

the chemical formula (22) ~~below~~ representing ~~a group of~~an unsubstituted or

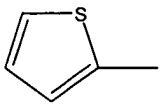
substituted (phenylmethyl)sulfanyl ~~groups,~~group:



(22),

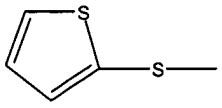
wherein R_{22} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, ~~$COOR_{22a}$, SO_2R_{22b} (R_{22a} represents H, Na, K, CH_3, or C_2H_5, and R_{22b} represents OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5~~), a CH_3 group, a C_2H_5 group, a C_3H_7 group, a $(CH_3)_2$-CH group, ~~and~~ a $(CH_3)_3$-C group, $COOR_{22a}$, and SO_2R_{22b}, where R_{22a} is H, Na, K, CH_3, or C_2H_5, and R_{22b} is OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5, and if more than one unit of the chemical formula (22) is present, R_{22} is independently selected ~~when multiple units exist, R_{22}'s may be different~~ for each ~~unit,~~unit;

the chemical formula (23) ~~below~~ representing a 2-thienyl ~~group,~~group:



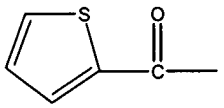
(23);

the chemical formula (24) ~~below~~ representing a 2-thienylsulfanyl ~~group,~~group:



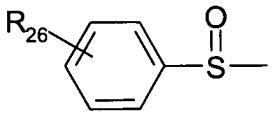
(24);

the chemical formula (25) ~~below~~ representing a 2-thienylcarbonyl ~~group.~~group:



(25);

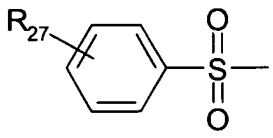
the chemical formula (26) ~~below~~ representing ~~a group of~~an unsubstituted or substituted phenylsulfinyl ~~groups,~~group:



(26),

wherein R_{26} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, ~~$COOR_{26a}$, SO_2R_{26b} (R_{26a} represents H, Na, K, CH_3, or C_2H_5, and R_{26b} represents OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5~~), a CH_3 group, a C_2H_5 group, a C_3H_7 group, a $(CH_3)_2$-CH group, ~~and~~ a $(CH_3)_3$-C group, $COOR_{26a}$, and SO_2R_{26b}, where R_{26a} is H, Na, K, CH_3, or C_2H_5, and R_{26b} is OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5, and if more than one unit of the chemical formula (26) is present, R_{26} is independently selected ~~when multiple units exist, R_{26}'s may be different~~ for each ~~unit,~~unit;

the chemical formula (27) ~~below~~ representing ~~a group of~~an unsubstituted or substituted phenylsulfonyl ~~groups,~~group:

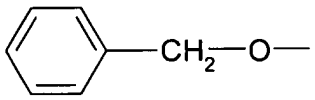


(27),

wherein R_{27} represents a substituent to an aromatic ring selected from an H atom, a halogen atom, a CN group, an NO_2 group, ~~$COOR_{27a}$, SO_2R_{27b} (R_{27a} represents H,~~

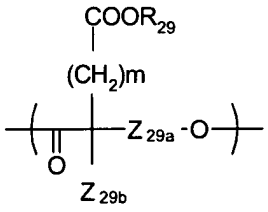
~~Na, K, CH_3, or C_2H_5, and R_{27b} represents OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5~~), a CH_3 group, a C_2H_5 group, a C_3H_7 group, a $(CH_3)_2$-CH group, ~~and~~ a $(CH_3)_3$-C group, $COOR_{27a}$, and SO_2R_{27b}, where R_{27a} is H, Na, K, CH_3, or C_2H_5, and R_{27b} is OH, ONa, OK, a halogen atom, OCH_3, or OC_2H_5, and if more than one unit of the chemical formula (27) is present, R_{27} is independently selected ~~when multiple units exist, R_{27}'s may be different~~ for each ~~unit,~~unit;

the chemical formula (28) ~~below~~ representing a (phenylmethyl)oxy ~~group,~~group:



(28).

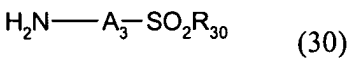
8. (Withdrawn) A method of producing a polyhydroxyalkanoate containing a unit represented by the chemical formula (1), comprising the step of subjecting a polyhydroxyalkanoate containing a unit represented by the chemical formula (29) and at least one kind of amine compound represented by the chemical formula (30) to a condensation reaction,



(29)

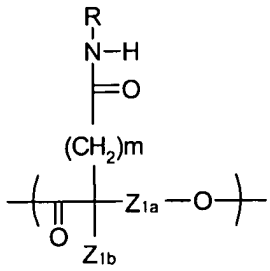
wherein R_{29} represents hydrogen or a group for forming a salt, m represents

an integer selected from 0 to 8, Z_{29a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{29b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, and when multiple units exist, R_{29}, Z_{29a}, Z_{29b}, and m each independently have the above meaning for each unit,



(30)

wherein R_{30} represents OH, a halogen atom, ONa, OK, or OR_{30a}, R_{30a} and A_3 are each independently selected from groups each having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, and when multiple units exist, R_{30}, R_{30a}, and A_3 each independently have the above meaning for each unit,

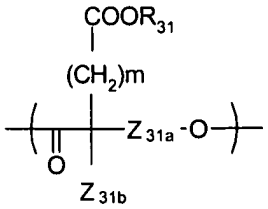


(1)

wherein R represents $-A_1-SO_2R_1$. R_1 represents OH, a halogen atom, ONa, OK, or OR_{1a}, R_{1a} and A_1 each independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or

unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, Z_{1a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{1b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and when multiple units exist, R, R_1, R_{1a}, A_1, Z_{1a}, Z_{1b}, and m each independently have the above meaning for each unit.

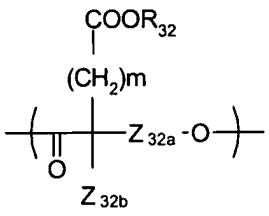
9. (Withdrawn) A method of producing a polyhydroxyalkanoate containing a unit represented by the chemical formula (32), comprising the step of hydrolyzing a polyhydroxyalkanoate containing a unit represented by the chemical formula (31) in the presence of an acid or an alkali or the step of subjecting the polyhydroxyalkanoate to hydrogenolysis including catalytic reduction,



(31)

wherein R_{31} represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, Z_{31a} represents a linear alkylene chain having 1 to 4 carbon atoms, the

linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{31b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and when multiple units exist, R_{31}, Z_{31a}, Z_{31b}, and m each independently have the above meaning for each unit,



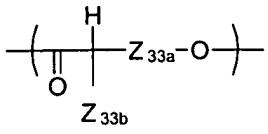
(32)

wherein R_{32} represents hydrogen or a group for forming a salt, Z_{32a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{32b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and when multiple units exist, R_{32}, Z_{32a}, Z_{32b}, and m each independently have the above meaning for each unit.

10. (Withdrawn) A method of producing a polyhydroxyalkanoate containing a unit represented by the chemical formula (35), comprising the steps of:

allowing a polyhydroxyalkanoate containing a unit represented by the chemical formula (33) to react with a base; and

allowing the compound obtained in the foregoing step to react with a compound represented by the chemical formula (34),

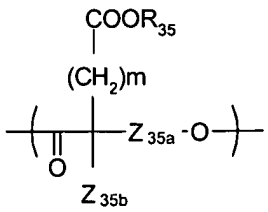


(33)

wherein Z_{33a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{33b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, and when multiple units exist, Z_{33a} and Z_{33b} each independently have the above meaning for each unit,

(34)

wherein m represents an integer selected from 0 to 8, X represents a halogen atom, and R_{34} represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms,



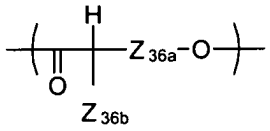
(35)

wherein R_{35} represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, Z_{35a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{35b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, m represents an integer selected from 0 to 8, and when multiple units exist, R_{35}, Z_{35a}, Z_{35b}, and m each independently have the above meaning for each unit.

11. (Withdrawn) A method of producing a polyhydroxyalkanoate containing a unit represented by the chemical formula (38), comprising the steps of:

allowing a polyhydroxyalkanoate containing a unit represented by the chemical formula (36) to react with a base; and

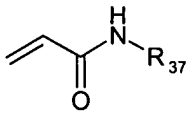
allowing the compound obtained in the foregoing step to react with a compound represented by the chemical formula (37),



(36)

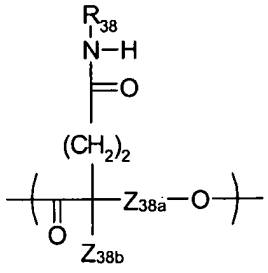
wherein Z_{36a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure,

and a cyclohexyl structure at a terminal thereof, Z_{36b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, and when multiple units exist, Z_{36a} and Z_{36b} each independently have the above meaning for each unit,



(37)

wherein R_{37} represents $-A_{37}-SO_2R_{37a}$. R_{37a} represents OH, a halogen atom, ONa, OK, or OR_{37b}, R_{37b} and A_{37} are each independently selected from groups each having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, and when multiple units exist, R_{37}, R_{37a}, R_{37b}, and A_{37} each independently have the above meaning for each unit,



(38)

wherein R_{38} represents $-A_{38}-SO_2R_{38a}$, R_{38a} represents OH, a halogen atom, ONa, OK, or OR_{38b}, R_{38b} and A_{38} each independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic

structure, Z_{38a} represents a linear alkylene chain having 1 to 4 carbon atoms, the linear alkylene chain has at least one linear or branched alkyl group, or at least one alkyl group containing a residue having any one of a phenyl structure, a thienyl structure, and a cyclohexyl structure at a terminal thereof, Z_{38b} represents a hydrogen atom, or a linear or branched alkyl group, aryl group, or aralkyl group which may be substituted by an aryl group, and when multiple units exist, R_{38}, R_{38a}, R_{38b}, A_{38}, Z_{38a}, and Z_{38b} each independently have the above meaning for each unit.